DOCUMENT RESUME

ED 195 343 PS 011 853

AUTHOR Ives, William
TITLE The Use of Orientations in Children's Drawings: Aspects of Representational Rule Use.
PUB DATE Sep 80
NOTE 21p.: Paper presented at the Annual Convention of the American Psychological Association (88th, Montreal, Quebec, Canada, September 1-5, 1980).

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Cognitive Processes: *Elementary School Students: *Freehand Drawing: *Kindergarten Children: *Visual Perception
IDENTIFIERS *Object Orientation: Representational Competence: Representational Thinking: Rule Application

ABSTRACT

It has been suggested that drawings are symbolic constructions which follow certain rules. In order to investigate one aspect of representational rule use in drawing, (an object's orientation), 36 kindergarten, second, and fourth grade children were asked to draw familiar objects placed in several orientations or an orientation of their choice. The results suggest that the orientation drawn is more likely to be consistent with representational rules than with the view before the child. Analogies with another symbol system, language, are discussed. (Author/RH)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

APA 1980

ED195343

U S DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION

THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY

The Use of Orientations in Children's Drawings: Aspects of Representational Rule Use

William Ives

Wheelock College and

Harvard Project Zero

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

William Ives

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

PS011853

Running Title: Drawing Rules

Footnote to Cover Sheet

Some of the results presented in this article were submitted in partial fulfillment of the degree of Ph.D. at the University of Toronto. The author would like to thank David Olson and Joanne Rovet for their advice in this project and Nancy R. Smith for her comments on an earlier draft. Special thanks to the children and staff of the Corvette Junior Public School in Scarborough, Ontario. Preparation of this article was supported by a Wheelock College faculty development grant to the author and a National Institute of Education grant (G-78-0031) to Harvard Project Zero. A portion of this paper was presented at the American Psychological Association, September 1980. The author's address is Wheelock College Graduate School, 200 The Riverway, Boston, MA 02215.

Abstract

It has been suggested that drawings are symbolic constructions which follow certain rules. In order to investigate one aspect of representational rule use in drawing, an object's orientation, 36 kindergartners, second, and fourth graders were asked to draw familiar objects placed in several orientations or an orientation of their choice. The results suggest that the orientation drawn is more likely to be consistent with representational rules than the view before the child. Analogies with another symbol system, language, are discussed.

The Use of Orientations in Children's Drawings: Aspects of Representational Rule Use

As Wolf(Note 1)remarks, when children leave the preschool years they come to view the graphic surface as a flat two-dimensional space with confining parameters; they begin to utilize certain construction rules which conform to this newly developed concept of the medium. For example, Goodnow (1977) suggests that each figure is given its own space and its own boundary thus conforming to the notion that lines lie flatly on the surface and objects cannot overlap each other. In addition, Goodnow and others (e.g., Jools, Note 2) have found that children are very conservative in their use of these rules and are reluctant to relinquish their use even when a situation calls for a change.

This paper will explore the use of one representational device, an object's orientation, in order to further articulate the nature of rule systems in children's drawings. After reviewing studies using tasks when children draw from memory without a model present, it will specifically focus on what occurs when there is a conflict between the rule system and the perceptual information before the child. The paper will then conclude with a discussion of the transformations from one rule system to another.

Drawing Within a Rule System

Arnheim (1974) has suggested that a person will generally draw objects in the orientation which represents the most economical graphic solution to placing the defining features of the object on a flat surface. Thus, one would expect people to be drawn in the front view to show the symmetry of features, and horses to be drawn in the side view to show the defining head in profile, mane, leg, and tail relationships. In one recent study Ives and Rovet (1979) found a consistent use of specific orientations when children of all ages and adults were asked to draw such familiar objects as people, horses, cars and houses.

Arnheim (1974) has also suggested that an orientation may be used to convey implicit information. For example, the side view may indicate motion since this orientation is one of the most economical ways of showing an object "moving" across the pictorial surface. Ives and Rovet (1979) found that both adults and children beyond first grade use the side view to indicate objects in motion. Younger children generally draw the object in its standard orientation in all conditions, whether it is to be at rest or in motion.

Ives and Rovet hypothesized that the use of object orientations follows certain rules which are analogous to feature marking in

language. The standard orientation is seen as similar to the unmarked or nominal linguistic case. The later-developing ability to depict a contrastive case, such as motion, through the use of a non-standard orientation is seen as similar to the ability to use marked or contrastive linguistic terms. It has been argued that in language use, the unmarked term stands for all cases until the marked term is mastered (e.g., Clark, 1973). Thus the term "more" presumably stands for quantity rather than a comparative amount until the term "less" is acquired. Likewise, the standard graphic orientation most likely does not represent the object in a particular orientation until it can be used in contrast to other orientations. In other words, children do not appear to relate orientation to view, but are rather more concretely choosing sides or "positions" of an object without regard to the actual view before them.

Ives and Housewroth (1980) tested this hypothesis in a subsequent study with kindergartners, second, and fourth graders using the presence or absence of relationships between objects as the contrastive and nominal cases. In other words, children were asked to draw one of three pairs of objects in a nominal condition (no implied relationship: "two people," "two dogs," "two horses"). They then drew the remaining two pairs of objects in two contrastive conditions ("_____talking to each other" or "_____looking at each other").

The results indicated that for drawings of dogs and horses, the major developmental shifts in graphically differentiating the nominal and contrastive instances occur between kindergarten and second grade. For people, however, the nominal case is not consistently differentiated from the contrastive until fourth grade. This decalage between referents fits the hypothesis of Ives and Rovet and is most likely caused by the relative difficulty in changing the standard orientation for people (front to side) as opposed to simply reversing the direction of the side-view objects (dogs and horses) to indicate facing.

These results suggest that in the development of two-dimensional graphic representation, children initially use a standard orientation for particular objects, and this form is used in all instances. Then more complex forms are acquired to allow for graphic differentiation. Young children appear constrained by their reliance on specific graphic rules as a framework for organizing drawings; as they progress through elementary school they become capable of moving beyond these initial rules and drawing configurations requiring more complex changes and irregular forms. However, the results are based on drawings from memory without an actual model present and children in the early elementary school years are quite capable of drawing from observation (Smith,Note 3). The following

study looks at what happens when children are confronted with a model, and more specifically, when the orientation of the model is in conflict with the standard graphic orientation.

The previous studies have suggested that children initially use orientation to portray important defining features of an object rather than a specific viewpoint. The following study provides an initial test of this hypothesis.

Thirty-six children, equal numbers of boys and girls, kindergarten, second and fourth graders were seen individually. All children attended an elementary school in a low-income area of Toronto. The children were asked to draw four objects in turn, a toy car, (5 cm. high by 18 cm. long) a toy house, (14 cm. high by 20 cm. long) a toy man, (18 cm. high by 5 cm. long) and a toy horse, (16 cm. high by 18 cm. long). Each toy was realistic in design. Each child drew all four objects in one of three conditions: the toys were placed by the experimenter in either a front or side orientation or placed by the child in an orientation of their choice.

Objects in the drawings were scored as being in either the front, side, or mixed orientation by two judges. Interjudge reliability was better than 95 percent.

A 3 (grade level) x 3 (placement condition) x 4 (object drawn) analysis of variance was carried out on the number of front view drawings. The object effect is significant $F(3.12) = 83.36$, $p < .001$ and accounts for 83 percent of the variance using Dwyer's (1974)

method for testing the magnitude of effects. The man and house are primarily drawn in the front orientation and horse and car in the side orientation regardless of the position in which they were placed. There is also a significant grade level x object interaction, $F(2,12) = 10.84$, $P < .005$ (5% of the variance), primarily reflecting the fact that younger children tend to draw the house in the front view while older children tend to draw the house in a combination of front and side views which was scored as mixed. Arnheim (1974) and others have suggested that this is the normal development course of house drawings as children provide increasingly more complex information. The placement effect is not significant. In addition, the object had a significant effect on the child's own placement, $F(3,6)=24.00$, PL.001 accounting for 92 percent of the variance with free-choice placements following the overall drawing patterns, man and house in the front and car and horse in the side.

The drawing and placement orientations in the present study are consistent with previous work using memory drawings (Ives & Houseworth, 1980; Ives & Rovet, 1979). Thus, children do not appear to initially relate orientation to a particular view, but rather choose a side or position which best fits their representational needs, without regard to the actual view before them. However, this does not necessarily mean that children igrore all the available perceptual information simply to draw what they know of cars, as Piaget and Inhelder (1956) suggest. While only 33 percent of the kindergartners carefully

examined the object as they drew, all of the second and fourth graders did. These older children reproduced many of the details of the object before them, yet changed the orientation to fit the standard form rather than the position presented them as seen in Figure 1. The objects before the children were left to right: a horse with spots, a Ford Mustang car, and a man with a police uniform and boots.

Insert Figure I About Here

Several questions remain: One is the relationship of graphic orientations to orientations used in other cognitive acts. Cooper and Shepard (1975) and Rosch, Mervis, Gray, Johnson, and Boyes-Graem (1976) report that mental images may be standardly oriented. Furthermore, Harris and Stronmen (1972) report that children align toys in similar orientations. It is not clear, however, whether the similarities between graphic orientations and those in other spatial acts reflect shared aspects in the construction of drawings and the images necessary for the other tasks, or as Piaget and Inhelder (1956) suggest the conceptual image simply determines the nature of drawings, as well as any other symbolic representation. It has been said by a number of researchers such as Arnheim (1974), Biber (1934),Olson (1970), Golomb (1973),and others that qualities particular to the graphic

medium determine the nature of drawings as much as conceptual imagery. Findings in another study (Ives, Note 4) add some support of this latter position. Specially, the standard graphic orientations were found to have no effect on children's ability to identify the photograph which shows their own or another's view of these same four objects. Further research is in order on this question.

Another question follows. If standard orientations in drawings are at least in part related to the nature of the medium it still remains to be sorted out whether these orientations are learned conventions or representations of the most economical way to represent the defining features of the objects on a flat surface. To answer this question, we either need to have children draw unfamiliar objects for which they have no predetermined schema or do research in cultures where children are unfamilar with drawing. While evidence of this type does not yet exist, children in a rural village in Trinidad (Ives & Rovet, in press) were asked to perform the same memory drawing tasks as those used in Ives & Rovet (1979) with similar results in all cases. So, if the standard orientations are simply learned at least they are widespread.

The Nature of Rule Changes

It is possible, as Pufall (Note 5) argues, that the analogies between drawing and language may reflect common underlying principles of symbolization. If this is the case, we may also find similarities in children's progress from one rule system to another within both language and drawing.

Drawing Rules

Willats (1979) argues that learning to draw involves progression through the use of different rule systems, each new system offering certain representational advantages and requiring greater powers of abstraction. Language development has been characterized as following the same general trend (e.g., Brown, 1973; Cromer, 1974). Brown (1973) suggests that transformations to new stages are a matter of adding new components and fiddling around with them until the new usage is mastered. Language acquisition then is not a process of direct imitation of higher level forms but rather the construction of new forms through interaction with the environment (e.g., Bruner, 1975). Goodnow's (1977) research in drawing suggested a likewise analogous step-wise progression.

Lewis and Livson's (1967) study of the transformation from two- to three-dimensionality in children's drawings of geometric figures also suggests a process of adding new components and making adjustments with them until a new stage is achieved. They found, for example, when presented with a cube to draw, young children drew a square, those slightly older tried a variety of approximations of a cube by adding forms to the square until, finally at age 10 or 11, children drew a cube with perspective. Similar results are seen in Willat's (1977) work on drawing common objects. In both studies children produced figures at certain stages with features which did not correspond to features found in perception of the environment or in adult drawing systems, adding further evidence for the constructed nature of drawing systems. Work by Burton (Note 6), Pariser (Note 7), and Snyder and

Feldman (1977) also indicates that children proceed, one step at a time in drawing development.

The work on graphic orientations is consistent with this step-wise developmental scheme. Children progress in discrete stages from one rule system to another, from the undifferentiated use of standard orientations to the use of specific orientations to convey information about the object. The specific view before the child is only one possibility. Even when children first come to depict actual features of objects placed before them, they only draw a few features; other aspects such as orientation remain in conformity to their rule systems. Evolution in drawing is a step-wise process.

Orientation is seen as a representational device which follows specific rules rather than an isomorphic image of the referent in one position. Orientation can serve a variety of informational functions, only one of which is to convey the specific view before the child. This latter function does not appear to develop until the elementary school years. These findings support the position that drawing is a symbol system which operates within the constraints of a medium.

Post Script

As representational drawing appears to be a symbol system tied to a medium, there will always be the need for a set of rules. One

cannot escape the constraints of the medium. For example, Merleau-Ponty (1964) discusses Cezanne's attempts to go beyond the medium, to paint nature directly without such rules as perspective. Commenting on the old masters, Cezanne wrote his friend Emile Bernard, "They created pictures, we are attempting a piece of nature." He added that the old masters "replaced reality by imagination and the abstraction which accompanies it." Bernard pointed out to his friend that he was aiming for reality while denying himself the means to attain it. Cezanne did go on to create a new reality, but a reality within the medium of paint.

Reference Notes

1. Wolf, D. When lines don't picture: The nature of preschooler's observational drawings. Paper presented at the American Psychological Association, September 1980.
2. Jools, P. Children's representations in drawing and speech. Unpublished paper, Marquarie University, 1980.
3. Smith, N. R. Drawing conclusions: Do children draw from observation? Paper presented at American Psychological Association, September 1980.
4. Ives, W. Children's ability to coordinate spatial perspectives through notational descriptions. Unpublished doctoral dissertation, University of Toronto, 1976.
5. Pufall, P. B. Drawing of action: A developmental study. Paper presented at the Piaget Society, Philadelphia, May 1979.

6. Burton, J. The illusion of space: Line use in early adolescent drawings. Paper presented at the American Psychological Assoc., Sept. 1980.

7. Pariser, D. Children's drawings of wrecked cars: A study in the development of form. Unpublished doctoral dissertation, Harvard University, 1976.

References

Arnheim, R. Art and visual perception. Berkeley: University of California Press, 1974.

Biber, B. Children's drawings: From lines to pictures. New York: Bank Street College of Education, 1934.

Brown, R. A first language: The early stages. Cambridge, MA: Harvard University Press, 1973.

Bruner, J. S. The ontogenesis of speech acts. Journal of Child Language, 1975, 2, 1-19.

Clark, E. V. What's in a word? On the child's acquisition of semantics in his first language. In T. Moore (Ed.), Cognitive development and the acquisition of language.

Cooper, L. A., & Shepard, R. N. Mental transformations in the identification of left and right hands. Journal of Experimental Psychology: Human Perception and Performance, 1975, 1, 48-56.

Cromer, R. F. The development of language and cognition: The cognition hypothesis. In B. Foss (Ed.), New Perspectives in Child Development. Hammondworth: Penguin, 1974.

Golomb, C. Children's representation of the human figure: The effects of models, media, and instructions. Genetic Psychology Monographs, 1973, 87, 197-251.

Goodnow, J. J. Children drawing. Cambridge, MA: Harvard University Press, 1977.

Harris, L. J., & Strommen, B. A. The role of front-back features in children's "front," "back," and "beside," placement of objects. Merrill-Palmer Quarterly, 1972, 18, 259-271.

Ives, W., & Houseworth, M. The role of standard orientations in children's drawings of interpersonal relationships: Aspects of graphic feature marking. Child Development, 1980, 51, 591-593.

Ives, W., & Rovet, J. The role of graphic orientations in children's drawings of familiar and novel objects at rest and in motion. Merrill-Palmer Quarterly, 1979, 25, 281-292.

Ives, W., & Rovet, J. Elementary school children's use of construction rules in drawings of familiar and novel objects: A cross-cultural replication. Journal of Genetic Psychology, in press.

Lewis, H. P., & Livson, N. Correlates of developmental level of spatial representation in children's drawings. Studies in Art Education, 1967, 9, 46-57.

Merleau-Ponty, M. Cezanne's doubt. In Sense and nonsence. Northwestern University Press, 1964.

Olson, D. R. Cognitive development: The child's acquisition of diagonality. New York: Academic Press, 1970.

Piaget, J., & Inhelder, B. The child's concept of space. New York: Norton, 1956.

Rosch, E., Mervis, C. B., Gray, W., Johnson, C., & Boyes-Graem, P. Basic objects in natural categories. Cognitive Psychology, 1976, 8, 382-429.

Snyder, S. S., & Feldman, D. H. Internal and external influences on cognitive developmental change. Child Development, 1977, 48, 937-943.

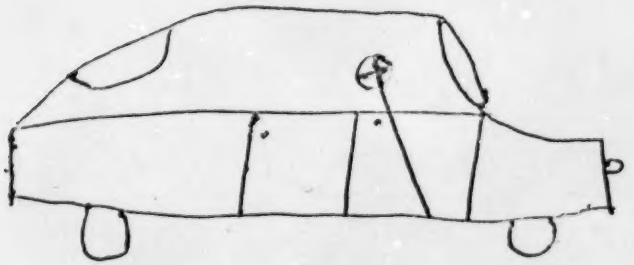
Willats, J. How children learn to draw realistic pictures. Quarterly Journal of Experimental Psychology, 1977, 29, 367-382.

Figure Caption

1. Children's drawings of familiar objects.

Front View Placed Before Child

Fourth Grader



Second Grader

Side View Placed Before Child

Fourth Grader